

**WHAT IS CLAIMED IS:**

1. A device for detecting a timing synchronization in a communication device, comprising:

first and second differential filters having a differential property transfer function, for respectively receiving and filtering a real number element and an imaginary number element of an input signal;

a first power detector for detecting a first power level from the real number element and the imaginary number element of the input signal;

a second power detector for receiving the real number element and the imaginary element filtered by the first and second differential filters and detecting a second power level from the real number element and the imaginary number element; and

a subtracter for subtracting the second power level detected by the second power detector from the first power level detected by the first power detector, and outputting the resultant value as a timing synchronization discriminating signal.

2. A device for detecting a timing synchronization in a communication device, comprising:

first and second band-pass filters for respectively filtering a real number element and an imaginary number element of an input signal by predetermined bands;

first and second differential filters having a differential property transfer function, for

respectively receiving and filtering the real number element and the imaginary number element output from the first and second band-pass filters;

a first power detector for receiving and detecting a first power level from the real number element and the imaginary number element respectively output from the first and second band-pass filters;

a second power detector for receiving and detecting a second power level from the real number element and the imaginary number element respectively output from the first and second differential filters; and

a subtracter for subtracting the second power level detected by the second power detector from the first power level detected by the first power detector, and outputting the resultant value as a timing synchronization discriminating signal.

3. A timing synchronization detecting apparatus in a communication device, comprising:

a timing error detecting unit for receiving and semi-symbol delaying a real number element and an imaginary number element of the input signal, and generating a real number signal by subtracting a one-symbol delayed real number element from the real number element of the input signal and an imaginary number signal by subtracting the one-symbol delayed imaginary element from the imaginary number element of the input signal;

a first power detector for receiving and detecting a first power level from a semi-symbol delayed real number element of the input signal and a semi-symbol delayed imaginary element of

the input signal output from the timing error detecting unit;

a second power detector for receiving detecting a second power level from the real number signal and the imaginary number signal generated by the timing error detecting unit; and

a subtracter for subtracting a value, which is obtained by multiplying the second power level detected by the second power detector by a predetermined coefficient, from the first power level detected by the first power detector to generate a timing synchronization discriminating signal.

4. The device of claim 3, wherein the timing error detecting unit comprises:

a first semi-symbol delay unit for delaying the real number element of the input signal by a semi-symbol period and outputting the semi-symbol delayed real number element;

a second semi-symbol delay unit for delaying the imaginary number element of the input signal by a semi-symbol period and outputting the semi-symbol delayed imaginary element;

a third semi-symbol delay unit for receiving and delaying by a semi-symbol period the semi-symbol delayed real number element of the input signal output from the first semi-symbol delay unit and outputting the one-symbol delayed real number element;

a fourth semi-symbol delay unit for delaying by a semi-symbol period the semi-symbol delayed imaginary number element of the input signal output from the second semi-symbol delay unit and outputting the one-symbol delayed imaginary number element;

a first subtracter for generating the real number signal subtracting the one-symbol delayed real number element output by the third semi-symbol delay unit from the real number element of the input signal; and

a second subtracter for generating the imaginary number signal by subtracting the one-symbol delayed imaginary number element output by the fourth semi-symbol delay unit from the imaginary number element of the input signal.

5. The device of claim 4, wherein the coefficient is 0.5.

6. A method for detecting a timing synchronization in a communication device,  
comprising:

detecting a first power level by semi-symbol delaying a real number element and an imaginary number element of an input signal;

detecting a second power level by one-symbol delaying the real number element and the imaginary number element of the input signal, and then subtracting the delayed real number element from the real number element of the input signal and the delayed imaginary number element from the imaginary number element of the input signal;

multiplying the second power level by a predetermined coefficient; and

subtracting the second power level multiplied by the predetermined coefficient from the first power level.

7. The method of claim 8, wherein the coefficient is 0.5.

8. A communication device, comprising:

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a timing synchronization detecting unit for generating a timing synchronization discriminating signal corresponding to a power difference between preceding and succeeding samples of an input signal that are respectively ahead of and behind the input signal by a semi-symbol period, respectively;

a detection timing deciding unit for deciding detection timing of the input signal according to the timing synchronization discriminating signal from the timing synchronization detecting unit; and

a data detecting unit for detecting the input signal according to the timing decided by the detection timing deciding unit.

9. The device of claim 8, wherein the detection timing is when the timing synchronization discriminating signal reaches a maximum value or an inflection point.

10. A method for detecting a timing synchronization in a communication device, comprising:
- differential filtering a real number element and an imaginary number element of an input signal;
  - detecting a first power level from the real number element and the imaginary number element of the input signal;
  - detecting a second power level from the differential filtered real number element of the input signal and the differential filtered imaginary number element of the input signal; and
  - subtracting the second power level from the first power level.